Air Quality in Alberta
October to December, 2000

Alberta Environment continuously monitors air quality in Edmonton (three stations), Calgary (three stations), Red Deer, Fort Saskatchewan and Beaverlodge (35 km west-northwest of Grande Prairie). Air quality parameters monitored at Alberta Environment stations include carbon monoxide, dust and smoke, oxides of nitrogen, ozone, total hydrocarbons, hydrogen sulphide, sulphur dioxide, ammonia and particulates (PM_{10} and $PM_{2.5}$). The Index of the Quality of the Air (IQUA) is calculated at the Edmonton, Calgary, Red Deer and Fort Saskatchewan stations. The IQUA converts air parameter concentrations into ***Good***, ***Fair***, ***Poor*** and ***Very Poor*** air quality ratings.

Highlights

- **Air quality was rated *Good* more than 99.8 per cent of the time at all monitoring stations in the fourth quarter of 2000.** At five of the eight monitoring stations (Calgary Central, Calgary Northwest, Edmonton Central, Red Deer and Fort Saskatchewan), ***Good*** air quality was recorded 100 per cent of the time. ***Good*** air quality is the best possible rating and means that there are no known harmful effects to human or environmental health.

- ***Fair*** air quality was reported for only eight hours. ***Fair*** air quality means that there is adequate protection against harmful effects. Based on the IQUA, average air quality readings were better than the 10-year average at all stations.

- ***Poor* and *Very Poor* air quality was not reported at any monitoring stations in the last quarter of 2000.** ***Poor*** and ***Very Poor*** air quality is rare in Edmonton and Calgary. In the last five years (1996 to 2000), there were only 10 hours of ***Poor*** air quality in Edmonton and 13 hours of ***Poor*** air quality in Calgary. There have been no occurrences of ***Very Poor*** air quality in the last five years in Edmonton or Calgary.

- **Carbon monoxide, dust and smoke, nitrogen dioxide, ozone and sulphur dioxide levels were well below Alberta's air quality guidelines from October to December of 2000.** However, the one-hour hydrogen sulphide guideline was exceeded two times at the Edmonton East monitoring station and five times

For current air quality conditions call ***427-7273*** in Edmonton and ***250-2099*** in Calgary.

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at the Calgary East monitoring station. Hydrogen sulphide levels exceeded Alberta's one-hour guideline at the Edmonton East station on November 5 (8 p.m. to 9 p.m.) and on November 26 (10 p.m. to 11 p.m.). These elevated levels were caused by emissions from petroleum storage tanks and petroleum transport vehicles. The one-hour hydrogen sulphide guideline was exceeded at the Calgary East station on October 9 (3 a.m. to 4 a.m.), October 18 (6 a.m. to 8 a.m.) and October 28 (7 a.m. to 9 a.m.). Elevated hydrogen sulphide levels at the Calgary East station were caused by emissions from the near-by sewage treatment facility. Maximum one-hour hydrogen sulphide concentrations recorded at the Edmonton East and Calgary East stations were 0.015 and 0.019 ppm (parts per million), respectively. These levels were well below levels known to affect human health and the environment. The one-hour guideline for hydrogen sulphide (0.010 ppm) is based on odour perception.

☞ **Concentrations of pollutants from automobiles continued to decline in the last quarter of 2000.** Carbon monoxide levels were 22 to 42 per cent lower than the average for the last 10 years (1990 to 1999) at Alberta monitoring stations. Nitrogen dioxide levels were slightly lower than the 10-year average (zero to nine per cent) at stations in Edmonton and Calgary. Dust and smoke values were 20 to 40 per cent lower than the 10-year average at Edmonton monitoring stations. However, dust and smoke levels at the Calgary East and Calgary Northwest monitoring stations were seven and 24 per cent higher than the 10-year average, respectively. Higher dust and smoke levels at these stations may have been due to dry weather conditions and lack of snow cover. The major sources of carbon monoxide, nitrogen dioxide and dust and smoke at urban locations are automobiles. Improvements in air quality at urban locations are primarily due to better emission controls for newer vehicles.

Number of Times Air Quality Guidelines were Exceeded - October to December, 2000

Station	Carbon Monoxide		Dust and Smoke	Hydrogen Sulphide		Nitrogen Dioxide		Ozone	Sulphur Dioxide	
	1-hour	8-hour	monthly	1-hour	24-hour	1-hour	24-hour	1-hour	1-hour	24-hour
Edmonton Central	0	0	0	n/a	n/a	0	0	0	n/a	n/a
Edmonton Northwest	0	0	0	n/a	n/a	0	0	0	n/a	n/a
Edmonton East	0	0	0	2	0	0	0	0	0	0
Calgary Central	0	0	0	n/a	n/a	0	0	0	n/a	n/a
Calgary Northwest	0	0	0	n/a	n/a	0	0	0	n/a	n/a
Calgary East	0	0	0	5	0	0	0	0	0	0
Red Deer	0	0	n/a	0	0	0	0	0	0	0
Fort Saskatchewan	0	0	0	0	0	0	0	0	0	0
Beaverlodge	n/a	n/a	n/a	n/a	n/a	0	0	0	0	0
Guideline	13 ppm	5 ppm	90% of values< 1 COH unit	0.01 ppm	0.003 ppm	0.212 ppm	0.106 ppm	0.082 ppm	0.172 ppm	0.057 ppm

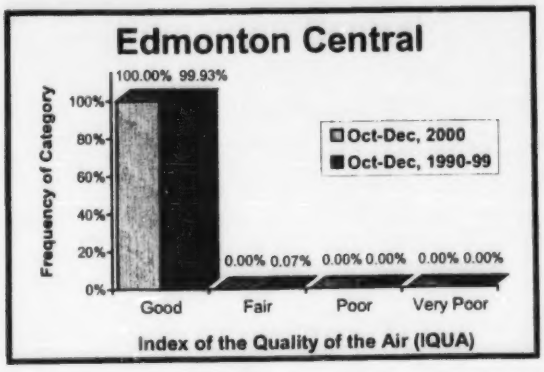
n/a Parameter not monitored at this location.

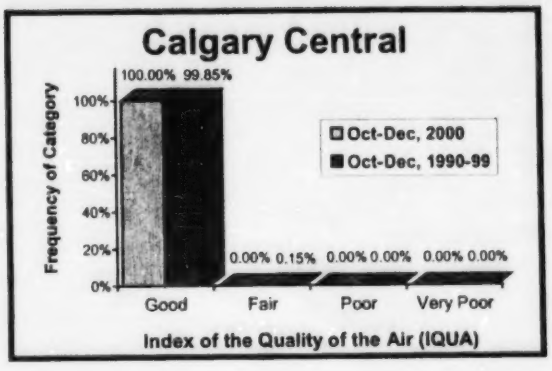
The Index of the Quality of the Air

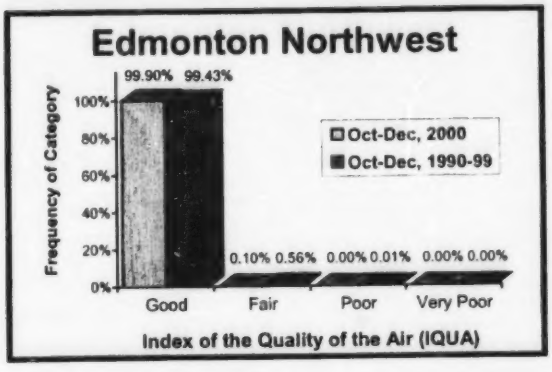
The index of the quality of the air (IQUA) provides the public with a meaningful measure of outdoor air quality. The IQUA is calculated every hour at all Edmonton, Calgary, Red Deer and Fort Saskatchewan monitoring stations. From this index, we can effectively rate air quality as Good, Fair, Poor or Very Poor. Air pollutants used to calculate the IQUA are carbon monoxide, dust and smoke, nitrogen dioxide, ozone and sulphur dioxide. Good, Fair, Poor and Very Poor air quality categories are directly related to guidelines under Alberta's *Environmental Protection and Enhancement Act*, and National Ambient Air Quality Objectives.

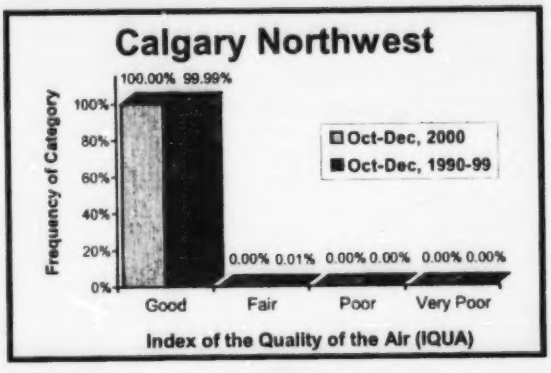
IQUA rating	Description
Good	Desirable range: no known harmful effects to soil, water, vegetation, animals, materials, visibility or human health. The long-term goal is for air quality to be in this range all of the time in Canada.
Fair	Acceptable range: adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility and human health.
Poor	Tolerable range: not all aspects of the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration and circumstances of the readings.
Very Poor	Intolerable range: in this range, continued high readings could pose a risk to public health.

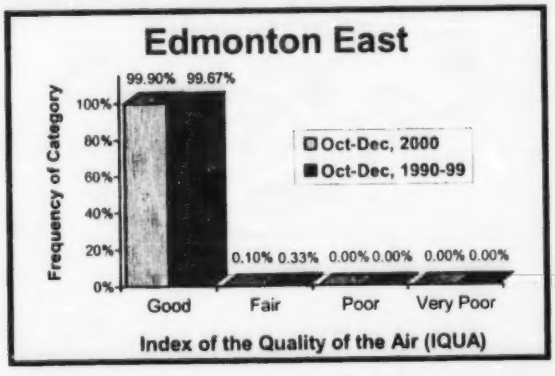
Source: Environment Canada. 1980. Guideline for a short-term air quality index. A report by the Federal-Provincial committee on Air Pollution.

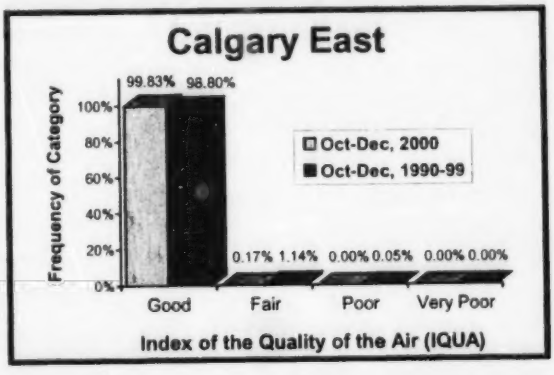

Edmonton Central
Frequency of Category
100.00% 99.93%
0.00% 0.07% 0.00% 0.00% 0.00% 0.00%
Oct-Dec, 2000
Oct-Dec, 1990-99
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)

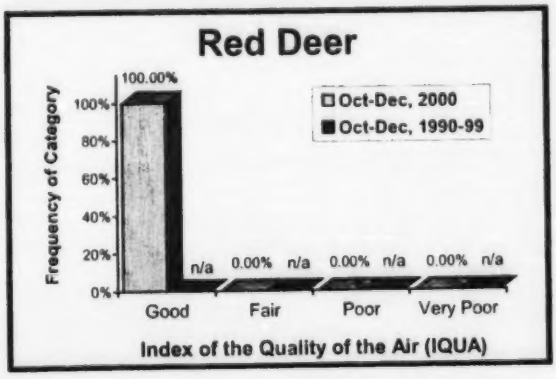

Calgary Central
Frequency of Category
100.00% 99.85%
0.00% 0.15% 0.00% 0.00% 0.00% 0.00%
Oct-Dec, 2000
Oct-Dec, 1990-99
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)

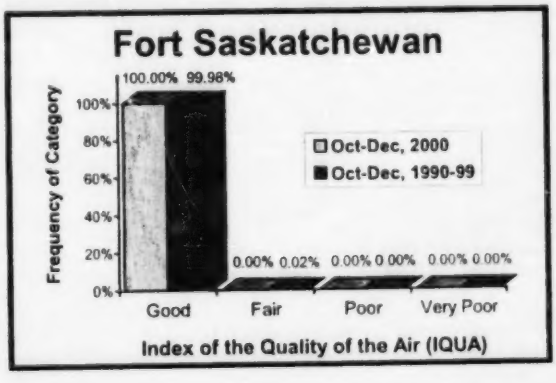

Edmonton Northwest
Frequency of Category
99.90% 99.43%
0.10% 0.56% 0.00% 0.01% 0.00% 0.00%
Oct-Dec, 2000
Oct-Dec, 1990-99
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Calgary Northwest
Frequency of Category
100.00% 99.99%
0.00% 0.01% 0.00% 0.00% 0.00% 0.00%
Oct-Dec, 2000
Oct-Dec, 1990-99
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Edmonton East
Frequency of Category
99.90% 99.67%
0.10% 0.33% 0.00% 0.00% 0.00% 0.00%
Oct-Dec, 2000
Oct-Dec, 1990-99
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Calgary East
Frequency of Category
99.83% 98.80%
0.17% 1.14% 0.00% 0.05% 0.00% 0.00%
Oct-Dec, 2000
Oct-Dec, 1990-99
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Red Deer
Frequency of Category
100.00%
n/a 0.00% n/a 0.00% n/a 0.00% n/a
Oct-Dec, 2000
Oct-Dec, 1990-99
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Fort Saskatchewan
Frequency of Category
100.00% 99.98%
0.00% 0.02% 0.00% 0.00% 0.00% 0.00%
Oct-Dec, 2000
Oct-Dec, 1990-99
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)

Average Concentrations - October to December, 2000 [a]

Parameter	Monitoring Period	Edmonton Stations			Calgary Stations			Red Deer [b]	Fort Saskatchewan	Beaverlodge [c]
		Central	Northwest	East	Central	Northwest	East			
Carbon Monoxide	Oct-Dec 2000	0.88	0.81	0.44	0.77	0.49	0.83	0.47	0.40	na
(ppm)	Oct-Dec 1990-99	1.26	1.18	0.57	1.32	0.77	1.23	na	0.61	na
Dust and Smoke	Oct-Dec 2000	0.13	0.21	0.22	0.27	0.15	0.36	na	0.15	na
(COH unit)	Oct-Dec 1990-99	0.22	0.30	0.27	0.25	0.12	0.37	na	0.16	na
Hydrogen Sulphide	Oct-Dec 2000	na	na	0.001	na	na	0.001	0.001	0.001	na
(ppm)	Oct-Dec 1990-99 [b]	na	na	0.001	na	na	0.001	na	0.001	na
Nitrogen Dioxide	Oct-Dec 2000	0.027	0.025	0.021	0.031	0.021	0.030	0.017	0.017	0.005
(ppm)	Oct-Dec 1990-99	0.028	0.027	0.022	0.034	0.021	0.030	na	0.018	0.005
Ozone	Oct-Dec 2000	0.009	0.010	0.013	0.008	0.014	0.009	0.012	0.013	0.020
(ppm)	Oct-Dec 1990-99	0.010	0.010	0.014	0.009	0.016	0.010	na	0.015	0.025
Sulphur Dioxide	Oct-Dec 2000	na	na	0.002	na	na	0.004	0.001	0.001	0.001
(ppm)	Oct-Dec 1990-99 [d]	na	na	0.003	na	na	0.004	na	0.003	0.000
Total Hydrocarbons	Oct-Dec 2000	2.06	2.72	2.53	2.22	2.25	2.36	2.82	2.16	na
(ppm)	Oct-Dec 1990-99	2.29	2.26	2.35	2.25	2.10	2.26	na	2.10	na
Particulate	Oct-Dec 2000	na	18.2	na	23.0	na	na	22.0	na	na
(PM_{10} in $\mu g/m^3$)	Oct-Dec 1994-97 [e, f]	na	20.1	20.5	21.8	na	na	na	na	na
Particulate	Oct-Dec 2000	9.5	11.5	10.3	10.3	na	na	na	na	na
($PM_{2.5}$ in $\mu g/m^3$)	Oct-Dec 1998 [g]	na	12.6	na	9.6	na	na	na	na	na
Ammonia	Oct-Dec 2000	na	na	na	na	na	na	na	0.004	na
(ppm)	Oct-Dec 1990-99	na	na	na	na	na	na	na	0.002	na

a All average values based on data collected from October to December.

b Hydrogen sulphide monitoring began in February 1991 at the Edmonton East station.

c Monitoring at the Beaverlodge station began in November 1997.

d Sulphur dioxide monitoring began in February 1999 at the Beaverlodge station.

e PM_{10} monitoring began in January 1996 at the Calgary Central station and November 1993 at the Edmonton Northwest station.

f PM_{10} was monitored from April 1998 to August 2000 at the Edmonton East station.

g $PM_{2.5}$ monitoring began in November 1997 at the Calgary Central station, July 1998 at the Edmonton Northwest station and September 2000 at the Edmonton East station.

h Monitoring at the Red Deer station began in December 1999.

n/a Parameter not monitored at this location.